

BUS LOAD DISTRIBUTION FACTORS

| Bus No | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------|---|------|------|------|---|------|---|------|
| Bus Load | 0 | 0.14 | 0.23 | 0.20 | 0 | 0.23 | 0 | 0.20 |

BRANCH DATA OF 8-BUS SYSTEM

| Br No. | From Bus | To Bus | R (p.u.) | X (p.u.) | Limit (MW) |
|--------|----------|--------|----------|----------|------------|
| 1 | 1 | 2 | 0 | 0.03 | 300 |
| 2 | 1 | 4 | 0 | 0.03 | 180 |
| 3 | 1 | 5 | 0 | 0.0065 | 300 |
| 4 | 2 | 3 | 0 | 0.011 | 210 |
| 5 | 3 | 4 | 0 | 0.03 | 270 |
| 6 | 4 | 5 | 0 | 0.03 | 240 |
| 7 | 5 | 6 | 0 | 0.02 | 210 |
| 8 | 6 | 1 | 0 | 0.025 | 210 |
| 9 | 7 | 4 | 0 | 0.015 | 300 |
| 10 | 7 | 8 | 0 | 0.022 | 340 |
| 11 | 8 | 3 | 0 | 0.018 | 180 |

HOURLY ELECTRICAL LOAD, RESERVE, AND HEAT LOAD

| Hour | E Load (MW) | Reserve (MW) | H Load (MBtu) | Hour | E Load (MW) | Reserve (MW) | H Load (MBtu) |
|------|-------------|--------------|---------------|------|-------------|--------------|---------------|
| 1 | 1382.88 | 69.14 | 0 | 13 | 1726.15 | 86.31 | 0 |
| 2 | 1294.62 | 64.73 | 0 | 14 | 1639.85 | 81.99 | 0 |
| 3 | 1078.85 | 53.94 | 0 | 15 | 1898.77 | 94.94 | 0 |
| 4 | 863.08 | 43.15 | 0 | 16 | 1941.92 | 97.10 | 0 |
| 5 | 1078.85 | 53.94 | 300 | 17 | 1834.04 | 91.70 | 300 |
| 6 | 1294.62 | 64.73 | 300 | 18 | 1920.35 | 96.02 | 300 |
| 7 | 1510.38 | 75.52 | 300 | 19 | 2020.38 | 101.02 | 300 |
| 8 | 1683.00 | 84.15 | 300 | 20 | 2030.19 | 101.51 | 300 |
| 9 | 1769.31 | 88.47 | 300 | 21 | 2040.00 | 102.00 | 300 |
| 10 | 1898.77 | 94.94 | 300 | 22 | 1990.96 | 99.55 | 300 |
| 11 | 1920.35 | 96.02 | 300 | 23 | 1877.19 | 93.86 | 300 |
| 12 | 1812.46 | 90.62 | 0 | 24 | 1769.31 | 88.47 | 300 |

CCGT UNIT DATA

| Unit Name | Bus No | Quick Start Capability (MW) | CT Num | ST Num | Duct Burner Maximum Fuel (MBtu) | Minimum MW to run Duct Burner (MW) | Duct Burner Minimum Fuel (MBtu) | Duct Burner efficiency | Cogeneration |
|-----------|--------|-----------------------------|--------|--------|---------------------------------|------------------------------------|---------------------------------|------------------------|--------------|
| CC1 | 4 | 150 | 2 | 1 | 0 | 0 | 0 | 0 | N |
| CC2 | 3 | 120 | 2 | 1 | 0 | 0 | 0 | 0 | N |

| | | | | | | | | | |
|-----|---|-----|---|---|-----|-----|----|------|---|
| CC3 | 6 | 100 | 2 | 1 | 400 | 200 | 40 | 0.91 | Y |
|-----|---|-----|---|---|-----|-----|----|------|---|

CT DATA1

| Unit Index | CT Index | Pmin (MW) | Pmax in base area (MW) | Pmax in aug area (MW) | Min ON (h) | Min OFF(h) | Ramp Up (MW/h) | Ramp Down (MW/h) |
|------------|----------|--------------|------------------------|-----------------------|------------|-------------|---------------------|----------------------|
| CC1 | CT1 | 40 | 141.5 | 155.5 | 2 | 2 | 100 | 100 |
| CC1 | CT2 | 40 | 141.5 | 155.5 | 2 | 2 | 100 | 100 |
| CC2 | CT1 | 30 | 90 | 100 | 2 | 2 | 90 | 90 |
| CC2 | CT2 | 30 | 90 | 100 | 2 | 2 | 90 | 90 |
| CC3 | CT1 | 20 | 60 | 60 | 2 | 2 | 60 | 60 |
| CC3 | CT2 | 20 | 60 | 60 | 2 | 2 | 60 | 60 |
| Unit Index | CT Index | MSR (MW/min) | nMSR (min) | Fuel Price (\$/Mbtu) | Ini T | Ini MW (MW) | Startup Fuel (MBtu) | Shutdown Fuel (MBtu) |
| CC1 | CT1 | 3.5 | 10 | 1 | -3 | 0 | 200 | 0 |
| CC1 | CT2 | 3.5 | 10 | 1 | -3 | 0 | 200 | 0 |
| CC2 | CT1 | 3 | 10 | 1 | 2 | 60 | 150 | 0 |
| CC2 | CT2 | 3 | 10 | 1 | 2 | 60 | 150 | 0 |
| CC3 | CT1 | 2 | 10 | 1 | -3 | 0 | 150 | 0 |
| CC3 | CT2 | 2 | 10 | 1 | -3 | 0 | 150 | 0 |

CT DATA2

| Unit Index | CT Index | Fuel-MW Curve | Fuel-MW Curve | Fuel-MW Curve | MW-Steam Curve | MW-Steam Curve | MW-Steam Curve | Fogger Capability | Peak-firing Fuel-MW HR |
|------------|----------|----------------------------|-------------------------|--------------------|----------------------------|------------------|-----------------------|-------------------|------------------------|
| | | a (MBtu/MW ² h) | b (MBtu/MWh) | c (MBtu/h) | a (MBtu/MW ² h) | b (MBtu/MWh) | c (MBtu/h) | (MW) | (MBtu/MWh) |
| CC1 | CT1 | 0.001534 | 7.1079 | 509.78 | 0.0010278 | 4.6201155 | 331.357 | 14 | 7.61 |
| CC1 | CT2 | 0.001534 | 7.1079 | 509.78 | 0.0010278 | 4.6201155 | 331.357 | 14 | 7.61 |
| CC2 | CT1 | 0.016087 | 5.5818 | 463.023 | 0.0117435 | 3.907281 | 328.74633 | 10 | 0 |
| CC2 | CT2 | 0.016087 | 5.5818 | 463.023 | 0.0117435 | 3.907281 | 328.74633 | 10 | 0 |
| CC3 | CT1 | 0.0017325 | 7.5244 | 558.68 | 0.0011088 | 4.5898913 | 351.9684 | 0 | 0 |
| CC3 | CT2 | 0.0017325 | 7.5244 | 558.68 | 0.0011088 | 4.5898913 | 351.9684 | 0 | 0 |
| Unit Index | CT Index | Fogger Fuel-MW HR | Peak-firing MW-Steam HR | Fogger MW-Steam HR | Peak-firing Fuel Ff0 | Forgger Fuel Ff0 | Peak-firing Steam Fg0 | Forgger Steam Fg0 | |
| | | (MBtu/MWh) | (MBtu/MWh) | (MBtu/MWh) | (MBtu) | (MBtu) | (MBtu) | (MBtu) | |
| CC1 | CT1 | 0 | 4.5 | 0 | 40 | 0 | 30 | 0 | |
| CC1 | CT2 | 0 | 4.5 | 0 | 40 | 0 | 30 | 0 | |

| | | | | | | | | | |
|-----|-----|------|---|-----|---|----|---|----|--|
| CC2 | CT1 | 7.42 | 0 | 1.5 | 0 | 60 | 0 | 10 | |
| CC2 | CT2 | 7.42 | 0 | 1.5 | 0 | 60 | 0 | 10 | |
| CC3 | CT1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| CC3 | CT2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |

ST DATA

| Unit Index | ST Index | High or Low Pressure | Pmin | Pmax | Min ON (h) | Min OFF(h) | Ramp Up (MW/h) | Ramp Down (MW/h) |
|------------|----------|----------------------|-------|----------|------------|----------------|-----------------|------------------|
| CC1 | ST1 | HP | 40 | 200 | 2 | 2 | 120 | 120 |
| CC2 | ST1 | HP | 50 | 270 | 2 | 2 | 150 | 150 |
| CC3 | ST1 | HP | 20 | 160 | 2 | 2 | 90 | 90 |
| | | | | | | | | |
| Unit Index | ST Index | Ini T | IniMW | MSR | nMSR | Steam-MW Curve | Steaml-MW Curve | Steam-MW Curve |
| | | (h) | (MW) | (MW/min) | (min) | a (MBtu/MW2h) | b (MBtu/MWh) | c (MBtu/h) |
| CC1 | ST1 | -3 | 0 | 3 | 10 | 0.021575 | 5.926527 | 245.8936 |
| CC2 | ST1 | 2 | 0 | 2.5 | 10 | 0.009523 | 2.8064 | 292.085 |
| CC3 | ST1 | -3 | 0 | 2 | 10 | 0.012396 | 5.5805 | 327.652 |

THERMAL UNIT DATA

| Unit Name | Bus No | Pmin | Pmax | Min ON | Min OFF | Ramp Up | Ramp Down | MSR | nMSR |
|-----------|--------|-------|---------------|---------------|---------------|--------------|------------|------------------------|-------|
| | | (MW) | (MW) | (h) | (h) | (MW/h) | (MW/h) | (MW/min) | (min) |
| T1 | 5 | 50 | 400 | 6 | 5 | 210 | 210 | 4 | 10 |
| T2 | 1 | 50 | 400 | 6 | 6 | 210 | 210 | 4 | 10 |
| T3 | 7 | 100 | 650 | 8 | 8 | 240 | 240 | 5 | 10 |
| Unit Name | IniT | IniMW | Fuel-MW Curve | Fuel-MW Curve | Fuel-MW Curve | Startup Fuel | Fuel Price | Quick Start Capability | |
| | (h) | (MW) | a (MBtu/MW2h) | b (MBtu/MWh) | c (MBtu/h) | (MBtu) | (\$/Mbtu) | (MW) | |
| T1 | -6 | 0 | 0.002 | 9.2642 | 609.659 | 400 | 1 | 60 | |
| T2 | 8 | 250 | 0.002 | 8.0661 | 563.341 | 300 | 1 | 60 | |
| T3 | 10 | 300 | 0.002 | 7.5247 | 468.825 | 300 | 1 | 100 | |